IN THE SPECIFICATION

Please replace paragraph [0029] with the following amended paragraph:

[0029]   For projection A, given a set of reference DRR images which correspond to different combinations of the two out-of-plane rotations (r_A, ϕ_A) ~~and (r_B, ϕ_B)~~, the 2D in-plane transformation (X_A, Y_A, ϕ_A) can be estimated by the 2D image comparison. Determining the two out-of-plane rotations (r_A, ϕ_A) ~~and (r_B, ϕ_B)~~ relies on which reference DRR is used for best similarity match. Similarly, the 2D in-plane transformation (X_B, Y_B, θ_B) and the out-of-plane rotations (r_B, ϕ_B) can be estimated for projection B.

Please replace paragraph [0037] with the following amended paragraph:

[0037]   In the next step, i.e. step 130 (phase 2 of the registration process), the two out-of-plane rotations (r, ϕ) are separately searched in one dimension, based on the values of the in-plane parameters (x, y, θ), determined in previous step 120. A plurality N_r and N_ϕ of out-of-plane rotation angles are~~may be~~ determined, respectively, for said rotational parameters (r, ϕ). A plurality $N_r * N_\phi$ of 2D reference images are~~may be~~ generated, one reference image for each of said plurality N_r and N_ϕ of said out-of-plane rotation angles. A more complicated similarity measure, based on pattern intensity (described in the '717 application), is used to detect the reference DRR image that corresponds to a combination of two out-of-plane rotations (r, ϕ). The search space for the possible rotation angles is the full search range of out-of-plane rotation angles. For an initial estimate, the full search range is sampled at every one-degree interval. In step 140 (phase 3), the in-plane translation parameters (x, y) are refined using 2D sub-pixel matching. 2D sub-pixel matching is a full range search method. Based on the updated transformation parameters (x, y, θ, r, ϕ) obtained from the previous step in the registration, a set of DRR images (3 x 3 or 5 x 5) is generated by translating the unknown reference DRR, one sub-pixel at a time. The in-plane translations (x, y) in sub-pixel accuracy are refined by finding the best match between the x-ray image and the DRR images.

Please replace paragraph [0045] with the following amended paragraph:

[0045]   The controller 208 includes means for generating a set of 2D DRR images of the target, using the 3D scan data from the CT scanner, and using the known location, angle, and intensity of the imaging beam generated by the radiation source. The controller 208 also includes software for determining a set of in-plane transformation parameters (x, y, θ) and out-of-plane rotational parameters (r, ϕ), the parameters representing the difference in the position of the target as shown in the x-ray image, as compared to the position of the target as shown by the 2D reconstructed images. The ~~software~~ controller 208 includes means for determining the out-of-plane rotational parameters (r, ϕ) ~~may be~~ configured to determine a plurality N_r and N_ϕ of out-of-plane rotation angles, respectively, for the rotational parameters (r, ϕ). The means for generating a set of 2D DRR images of the target ~~may be~~is configured to generate a plurality $N_r *$ N_ϕ of 2D reference images, one reference image for each of the plurality N_r and N_ϕ of the out-of-plane rotation angles.